

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re application of: )  
Powell et al )  
Serial No. )  
Filed: herewith )  
Examiner: )  
Art Unit: )  
For: SOLVENT EXTRACTION )  
PROCESS )

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PRELIMINARY AMENDMENT AND CLAIM OF PRIORITY

Commissioner for Patents  
Washington, D.C. 20231

Sir:

Preliminary to the examination of the above captioned  
continuation-in-part application filed concurrently herewith,  
please amend the application as follows:

In the Title:

Delete "SOLVENT EXTRACTION PROCESS" and replace with --  
PROCESS FOR THE EXTRACTION OF A COMPOUND BY A FLUOROCARBON  
COMPOUND--.

Abstract of the Disclosure:

Append the Abstract of the Disclosure attached hereto to the  
application following the claims.

**In the Specification:**

On Page 1, after the title and before the first line of the text, insert the following:

--RELATED APPLICATION

This application is a continuation-in-part of application Serial No. 08/716,269, filed January 31, 1997.--

On pages 4 and 5, amend the paragraph bridging those pages to read as follows:

Although extraction solvents comprising a perfluorocarbon such as perfluoropropane may be usefully employed in the process of the present invention, the preferred extraction solvents will comprise one or more hydrofluorocarbons. Hydrofluorocarbons having from 1 to 3 carbon atoms, especially the hydrofluoromethanes, hydrofluoroethanes and hydrofluoropropanes, are more preferred, and of these the hydrofluorocarbons having 2 carbon atoms, especially the hydrofluoroethanes, are particularly preferred. Examples of hydrofluoromethanes and hydrofluoroethanes which may be useful in the extraction process of the present invention include, inter alia, trifluoromethane, fluoromethane, difluoromethane, pentafluoroethane, 1,1,1-trifluoroethane, 1,1,2,2-tetrafluoroethane and 1,1,1,2-tetrafluoroethane.

Suitable hydrofluoropropanes for use in the present process may be selected from the pentafluoropropanes, the hexafluoropropanes and the heptafluoropropanes.

Suitable pentafluoropropanes and hexafluoropropanes include 1,1,1,3,3-pentafluoropropane (R-245fa), 1,1,2,2,3-pentafluoropropane (R-245ca), 1,1,1,2,3-pentafluoropropane (R-245eb), 1,1,2,3,3-pentafluoropropane (R-245ea), 1,1,1,2,3,3-hexafluoropropane (R-236ea), 1,1,1,2,2,3-hexafluoropropane (R-

236cb) and 1,1,1,3,3,3-hexafluoropropane (R-236fa). A particularly preferred pentafluoropropane is R-245fa. A particularly preferred hexafluoropropane is R-236ea.

In a preferred embodiment, the hydrofluoropropane that is used in the process of the invention is a heptafluoropropane. The heptafluoropropane which is employed in this preferred embodiment may be 1,1,1,2,3,3,3-heptafluoropropane (R-227ea) or 1,1,1,2,2,3,3-heptafluoropropane (R-227ca). Mixtures of the two heptafluoropropanes may also be employed. The preferred heptafluoropropane is 1,1,1,2,3,3,3-heptafluoropropane (R-227ea).

**In the Claims:**

Cancel claims 1-37 and replace them with new claims 38-56 as follows:

--38. A process for extracting a compound or composition of matter from a raw material containing that compound or composition as a constituent part, which process comprises the steps of (1) contacting a sample of the raw material with an extraction solvent comprising a  $C_{1-3}$  hydrofluorocarbon selected from the group consisting of difluoromethane, pentafluoroethane and hydrofluoropropanes and a co-solvent to form a solvent liquor comprising the extraction solvent and an extract from the raw material, and (2) separating the solvent liquor containing the extract from the raw material.--

--39. A process as claimed in claim 38, wherein the  $C_{1-3}$  hydrofluorocarbon is a hydrofluoropropane.--

--40. A process as claimed in claim 39, wherein the hydrofluoropropane is 1,1,1,2,3,3,3-heptafluoropropane.--

--41. A process as claimed in claim 38 or claim 40, wherein the extract comprises a biologically active compound or a precursor thereof.--

--42. A process as claimed in claim 41, wherein the extract comprises a pesticide or a precursor thereof.--

--43. A process as claimed in claim 42, wherein the pesticide is a pyrethroid.--

--44. A process as claimed in claim 41, wherein the extract comprises a pharmaceutically active substance or a precursor thereof.--

--45. A process as claimed in claim 44, wherein the extract comprises a penicillin, an alkaloid, paclitaxel, taxane, a monensin or a cytochalasin.--

--46. A process for extracting a natural product from a plant material containing that product as a constituent part, which process comprises the steps of (1) contacting a sample of the plant material with an extraction solvent comprising a C<sub>1-3</sub> hydrofluorocarbon selected from the group consisting of difluoromethane, pentafluoroethane and hydrofluoropropanes and a co-solvent to form a solvent liquor comprising the extraction solvent and an extract from the plant material, and (2)

separating the solvent liquor containing the extract from the plant material.--

--47. A process as claimed in claim 45, wherein the  $C_{1-3}$  hydrofluorocarbon is a hydrofluoropropane.--

--48. A process as claimed in claim 47, wherein the hydrofluoropropane is 1,1,1,2,3,3,3-heptafluoropropane.--

--49. A process as claimed in claim 46 or claim 48, wherein the natural product is a flavored or aromatic composition.--

--50. A process as claimed in claim 46 or claim 48, wherein the natural product is a flavored or aromatic oil.--

--51. A process as claimed in claim 38 or claim 46, wherein the extraction solvent comprises a co-solvent having a boiling point in the range of from -85 to 20°C.--

--52. A process as claimed in claim 38 or claim 46, wherein the co-solvent is a  $C_{2-6}$  hydrocarbon.--

--53. A process as claimed in claim 38 or claim 46, wherein the co-solvent is a  $C_{2-4}$  alkane.--

--54. A process as claimed in claim 38 or claim 46, wherein the co-solvent is a dialkyl ether.--

--55. A process as claimed in claim 38 or claim 46, wherein the co-solvent is dimethyl ether, butane or a mixture thereof.--

### Marked-Up Amendment

Although extraction solvents comprising a perfluorocarbon such as perfluoropropane may be usefully employed in the process of the present invention, the preferred extraction solvents will comprise one or more hydrofluorocarbons. Hydrofluorocarbons having from 1 to 3 carbon atoms, especially the hydrofluoromethanes, hydrofluoroethanes and hydrofluoropropanes, are more preferred, and of these the hydrofluorocarbons having 2 carbon atoms, especially the hydrofluoroethanes, are particularly preferred. Examples of hydrofluoromethanes[,] and hydrofluoroethanes [and hydrofluoropropanes] which may be useful in the extraction process of the present invention include, inter alia, trifluoromethane, fluoromethane, difluoromethane, pentafluoroethane, 1,1,1-trifluoroethane, 1,1,2,2-tetrafluoroethane[.] and 1,1,1,2-tetrafluoroethane[, 1,1,1,2,3,3-hexafluoropropane, 1,1,1,2,2,3-hexafluoropropane and 1,1,1,3,3,3-hexafluoropropane].

Suitable hydrofluoropropanes for use in the present process may be selected from the pentafluoropropanes, the hexafluoropropanes and the heptafluoropropanes.

Suitable pentafluoropropanes and hexafluoropropanes include 1,1,1,3,3-pentafluoropropane (R-245fa), 1,1,2,2,3-pentafluoropropane (R-245ca), 1,1,1,2,3-pentafluoropropane (R-245eb), 1,1,2,3,3-pentafluoropropane (R-245ea), 1,1,1,2,3,3-hexafluoropropane (R-236ea), 1,1,1,2,2,3-hexafluoropropane (R-236cb) and 1,1,1,3,3,3-hexafluoropropane (R-236fa). A particularly preferred pentafluoropropane is R-245fa. A particularly preferred hexafluoropropane is R-236ea.

In a preferred embodiment, the hydrofluoropropane that is used in the process of the invention is a heptafluoropropane.



--56. A process as claimed in claim 38 or claim 46, wherein the extraction solvent is in liquid form.--

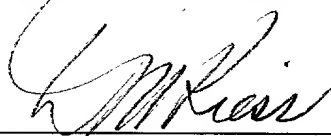
**REMARKS**

Applicants continue to claim priority, as they did in the parent application Serial No. 08/716,269, on application No. PCT/GB95/00554, filed March 15, 1995, which application claimed priority on United Kingdom application No. 9406423.5, filed March 31, 1994.

This application's immediate parent application, Serial No. 08/716,269, has now been allowed and is scheduled to issue on May 1, 2001 as Patent No. 6,224,847.

Early examination and allowance are solicited.

Respectfully submitted,



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